

Carroll-Loye Biological Research

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Test Reference: EMD-003& EMD-004

CLBR Training Manual

§1.c. Practicing and performing dosimetry with Pump Spray, Aerosol Spray and Lotion delivery systems

A. Goals of exercise

1. Determine your preferred practices for applying ('self-dosing') spray and lotion repellents to your arms and legs.
2. Assist technicians in measuring the amounts of such repellents that you apply when using your practices

B. General information

1. A technician will measure the surface area of your forearms and lower legs. He or she will introduce you to the repellents and their containers
2. You will work in open air, practicing applying the repellents from each type of container. A technician will help you keep track of your preferred techniques.
3. Using small gauze "bracelets" around your limbs to capture samples of repellent you spray on, you will apply repellents with your preferred practices several times. The bracelets will be quickly removed and weighed. You will thoroughly wash your limbs with a gently skin cleaner between each application of repellent.

C. Materials and equipment needed

1. Test materials
2. Latex or vinyl gloves (various sizes)
3. Bracelet dosimeters with nonabsorbent backing
4. Temperature, humidity and wind speed measuring devices
5. Written copy of the procedures for subjects to read
6. Flexible metric rule

1. Study subjects
c. Dosimetry (sprays and lotion)
i. practice
ii. performance
(v. 1, 12 September 2006)

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D. Practicing the methods and performing the measurements

Measuring arms and legs¹:

Limb is use to refer to your forearm and your lower leg. A technician will measure the distance around your limbs at four evenly spaced places on the forearm (elbow to wrist) and lower leg (back of knee to ankle), and also length of those limbs.

Working with the pump spray and aerosol spray, and determining your preferred method of applying the repellents:

Your trainer/technician will help to introduced you to how the spray bottles work and how you will determine your preferred methods of applying them. You will read the written procedures that follow here together.

“Read along on your copy of the procedure as the Researcher reads them to you. Ask questions of the Researcher as they occur to you or at any time thereafter. Be sure to get answers to any questions you feel should be answered before proceeding at any step of this work.

This is a study of your behavior in applying spray insect repellents. You will probably have had experience with applying spray products of some kind to your skin before. If you are uncertain about how to use a spray dispenser be sure to ask the Researcher or one of the technicians. You will each have the opportunity to practice these procedures with the aid of a technician.

Insect repellents function to repel insects from biting the skin. Their effectiveness is influenced by the completeness of their application to the skin surface. Our goal is to determine your preferred method for achieving **full coverage**. At minimum, **full coverage** is defined as a continuous and complete layer of test material. Orienting the arm to light may aid in determining whether full coverage has been achieved. Spray as much as necessary to achieve full coverage.

¹ **Limb dimensions and surface area (technical details):**

The term ‘limb’ refers to the forearm and ¹the lower leg. The surface area of each limb is computed as the average of four evenly spaced circumferences (two peripheral, two central) of the forearm (elbow to wrist) or lower leg (back of knee to ankle) multiplied by the length of treatment area. The locale along the limb at which each circumference is taken will be recorded (for later use to place dosimeters) as the distance in centimeters from the distal margin of the site of the most distal circumference site (i.e., at wrist or ankle).

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In these instructions, the act of spraying a repellent on your arm will be termed ‘spraying’, ‘application’, or ‘dispensing.’

If you are wearing a long-sleeved shirt roll the sleeves so as to expose the entire lower arm. Wash arms thoroughly with the provided cleanser and dry with a clean towel. Place new latex or vinyl gloves on each hand, choosing the size that fits you most snugly without being uncomfortably restricting or likely to tear when you put them on.

You will work with a technician who will assist you in measuring and recording your use of a repellent product in two delivery systems, a pump spray and an aerosol spray.

Work first with the pump spray, second with the aerosol spray. Because they are similar, the application instructions below describe the procedures for each type of spray together in each paragraph.

Familiarize yourself with the spray mechanism. Any actuation (pushing down on the pump plunger) of the spray must take place out-of-doors. Work at a distance of no less than 6 feet (1.9 meters) from other subjects. Do not dispense the spray at or near your face or anyone else’s. Minimize inhalation of airborne spray while working.

Testing will take place out-of-doors during daylight hours at an air temperature (shade) above 14 °C (57 °F) and wind speed below 12 kph (7 mph), with no precipitation. The researcher or a technician will inform you when these conditions are not met and spraying of the repellents will cease until those conditions resume.

Dispense the spray on one forearm, using the opposite hand. By successively moving the spray nozzle closer to and farther from the arm, identify a distance between nozzle and skin that seems most appropriate for effective application to the skin. The technician will measure and record that distance to the nearest centimeter on the provided datasheet.

Have the technician wash and dry the treated arm so that none of the repellent you have applied is visible on close inspection.

Now, using the spray nozzle at or near the distance from the skin that you have just chosen to be effective for application, determine the minimum number of actuations (pumps of the pump spray) or longitudinal passes (aerosol) required to give full coverage of all surfaces of the forearm. For the pump spray, depress the plunger fully each time, and count them aloud beginning with “1, 2, 3” etc. If you partially depress the plunger (rather than fully depress it) in order, e.g., to apply to a small skin area not covered by initial application, report that to the technician as a “half pump.” Each partial depression should be so reported as it occurs. If on any given actuation material fails to be delivered, do not count that actuation. If a partial amount is delivered, consider it either ‘whole’, ‘half’ or ‘none’ and report it as such. For ‘none’, simply resume counting at the next actuation that delivers material to the skin.

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